

REMARKS

Claims 1-5 and new claims 14-18 are the only active claims pending in this application. Claims 6-13 are presently withdrawn. The foregoing separate sheets marked as "Listing of Claims" show all the claims in the application, each with an indication at its first line showing the claim's current status.

Applicant respectfully notes the Examiner's consideration, and listing on the Form PTO-892, of U.S. Patent No. 5,373,538 to Grenier et al., which by Applicant's inadvertent oversight was identified on Applicant's IDS only by inventor name.

I. Claim Objections

Responding to the Office Action's objection to claims lacking parentheses for reference characters, Applicant respectfully submits the above-amended claims deleting the subject reference characters. Applicant therefore respectfully requests reconsideration and withdrawal of this objection.

II. Rejections Under 35 U.S.C. § 112, second paragraph

The Office Action rejects claims 1-5 on the stated reasoning that "the single energy value" of 12 MeV, "[a]lthough ... clearly a point in the [claimed] region[, is such that] the metes and bounds of the claim are indefinite" under 35 U.S.C. § 112, second paragraph. Office Action at p. 3.

Applicant respectfully traverses this rejection. The examined claim 1 defines the subject photon energy spectrum as: "the entire photon energy spectrum which exceed[s] background photon radiation, at least as far as the region of 12 MeV." Applicant respectfully submits that a person of ordinary skill in the art would understand the recitation as definitely meaning the spectrum of energy extending from the background photon radiation up to at least 12 MeV.

Applicant submits that, reading the claim in its entirety, which is required for determining definiteness under 35 U.S.C. § 112, the metes and bounds of the claimed “entire photon energy spectrum” is clearly and specifically defined.

Notwithstanding Applicant’s traversal, to expedite the instant claims Applicant has amended claim 1 to recite: “the entire photon energy spectrum exceeding background photon radiation up to and including 12 MeV.” Applicant respectfully submits that a person of ordinary skill in the art will clearly understand, from the plain meaning of the amended language, the metes and bounds of this “entire photon energy spectrum,” and of the entire claim. Applicant therefore respectfully requests this rejection be withdrawn.

The Office Action rejects claims 1-5 on the stated reasoning that the recital of “and/or ... render[s] indefinite whether the metes and bounds of the claimed subject matter ... is defined by ‘elements and isotopes’ or merely ‘elements or isotopes.’” Office Action at pp. 3-4.

In response, Applicant has amended all instances of “and/or” in claims 1-5 to recite only “elements *and* isotopes.” Applicant submits new claims 14-18 that recite “elements *or* isotopes.” Applicant respectfully submits that the amended claims 1-5 and new claims 14-18 remove the stated basis for this rejection. Accordingly, Applicant respectfully requests this rejection be reconsidered and withdrawn.

The Office Action rejects claim 2 on the stated reasoning that “the complete measurable range” renders the claim indefinite. Applicant respectfully submits that the amended claim 2 deletes the subject phrase, thereby obviating the rejection. Applicant therefore respectfully requests this rejection be withdrawn.

III. Rejections Based on Prior Art

The Office Action rejects claims 1 -5 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,373,538 (“Grenier”) in view of U.S. Patent No. 4,397,810 (“Salisbury”). Office Action at pp. 4-7.

Applicant respectfully traverses the rejection. Applicant submits that the primary reference, Grenier, is an exemplar prior art method described in the Background of Applicant’s specification. *See, e.g.*, Applicant’s specification, at page 1, line 25, through page 2, line 22. As described in Applicant’s specification, Grenier and similar methods irradiate a test object with high-energy neutrons, causing a destructive nuclear reaction in the test object, which in turn forms new radionuclids or isomers. The radionuclids or isomers result in gamma photons. In other words, the principle of operation of Grenier (and similar methods) is to irradiate the target with high-energy neutrons, “preferably 14 MeV,” high enough such that all “three ... gamma photon categories” are produced from the resulting nuclear reaction, at a quantity sufficient to have a “certainty of detecting [at least] one of the three.” Grenier, at col. 6, lines 48-54. The three categories of gamma photons, all resulting from nuclear reactions, are described at col. 1, lines 19-32.

Applicant’s claimed method distinguishes over Grenier, according to its claim elements and arrangements of elements, and according to its principle of operation. Applicant’s claimed method irradiates the test object with low energy neutrons, generated by target free fusion of concentrically accelerated deuterium ions. This irradiating of the target using low energy neutrons generates photons by the mechanism Applicant describes, and illustrates in Applicant’s Fig. 2, which is fundamentally different from that employed by Grenier, i.e., high-energy neutrons inducing nuclear reactions. Not only are Applicant’s claimed method and the mechanism of nuclear physics it employs fundamentally different than Grenier, but also Applicant’s method generates a fundamentally

different energy spectrum than the energy spectra of the photons generated by Grenier's method (i.e., resulting from nuclear reaction).

Stated with greater specificity, the energy spectrum of the photons produced by Applicant's claimed step of exciting the test object with the method's low-energy neutrons is the energy band extending from the background photon radiation energy up to and including 12 MeV. (Above 12 MeV is outside of the energy of photons produced by exciting the test object with the method's low-energy neutrons. *See* Specification at p. 4, lines 8-13)

As Applicant describes and claims, *within the entire photon energy spectrum* produced by Applicants exciting the test object with *low energy* neutrons, is *at least one characteristic photon energy* that corresponds, unambiguously, *to each of the elements and isotopes that constitute the test object*.

As Applicant further describes, and claims, Applicant's method measures this entire energy spectrum of photons resulting from low-energy neutrons and based on this, based on this, determines each and every element and isotope of which the test object is constituted.

The secondary reference, Salisbury, indeed discloses irradiating an object with low energy neutrons. Salisbury, however, adds *nothing* to Grenier with respect to Applicant's invention. As a preliminary matter, Applicant restates that Grenier requires high-energy neutrons. Excitation with low energy neutrons is inconsistent with Grenier's principle of operation. Turning to Salisbury, read in its entirety it teaches nothing of modifying Grenier toward Applicant's method. Salisbury teaches *nothing* of the entire energy spectrum of the photons produced by excitation with low energy neutrons. Salisbury teaches *nothing* of there being a photon energy unambiguously corresponding to each and every element and isotope constituting any test object. Salisbury teaches *nothing* of measuring the entire energy spectrum of the photons produced by excitation with low energy neutrons.

Applicant respectfully requests, for the reasons identified above, that the rejection of claims 1 – 5 be reconsidered and withdrawn.

Conclusion

In view of the foregoing, Applicant respectfully requests that claims 1 – 5 and new claims 14-18 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,



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